

DRUG THERAPY PROBLEMS AND THEIR PREDICTORS AMONG
HYPERTENSIVE PATIENTS ON FOLLOW UP IN DILL CHORA REFERRAL
HOSPITAL, DIRE DAWA, EASTERN ETHIOPIA



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ABSTRACT

Background: *The optimal treatment of hypertension plays a key role in achieving target blood pressure in hypertensive patients. The efficacy of a medication regimen, however, may be limited by a range of drug therapy problems. The objective of the study was to assess drug therapy problems among hypertensive patients and their predictors on follow up.*

Materials and Methods: *A Hospital based cross-sectional study was conducted from 10 March to 10 April, 2015 to assess drug therapy problems among hypertensive patients and their predictors on follow up in Dill Chora Referral Hospital. A convenient sampling method was used and a total of 271 hypertensive patients were included in the study. Data were collected through medical record reviews of patients including prescriptions using a prepared standard checklist and pre-tested questionnaire. All data were coded and entered using SPSS version 20.0 for statistical analysis. Data were described and summarized using tables and graphs. Prevalence of drug therapy problem was determined using descriptive statistics. Mean & Standard deviation of all continuous variables were calculated. Bivariate and multivariate logistic regression analysis with 95% confidence interval was employed to infer associations and predictions.*

Result: *A total of 378 drug therapy problems were identified in 271 patients, averaging 1.39 ± 1.28 problems per patient. There were more females (60.1%) than males (39.9%) hypertensive patients. Mean age of the patients was 57.73 ± 12.13 years, ranging from 25 to 94 years. One hundred ninety three (71.2%) of the patients had at least one DTP. Need additional drug therapy (62.43%) and non-adherence (45.75%) were the two most common DTP identified. Independent factors which predicted the occurrence of DTPs in the study population were presence of comorbidity (AOR = 5.74, 95%CI = 2.49, 13.00) number of medication, (AOR = 7.03, 95%CI = 2.33, 21.25) and suboptimal blood pressure (AOR = 7.67, 95%CI = 3.70, 15.90).*

Conclusion and Recommendation: *DTPs are common among hypertensive patients on follow up in the study area and most commonly need additional drug therapy and non-adherence. Patients with hypertension are prone to different DTP for different reasons including presence of comorbidity and concurrent medication. Patients need for hypertensive treatment should be tailored and a strategy to promote pharmaceutical care is highly needed and training of patients in medication use is essential.*

Key words: *Hypertension, Drug therapy problems, Dire Dawa, Ethiopia*

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ABBREVIATION AND ACRONMYS

ACEI	Angiotensin Converting Enzyme Inhibitor
ADR	Adverse Drug Reaction
AOR	Adjusted Odds Ratio
BB	Beta Blockers
BP	Blood Pressure
CCB	Calcium Channel Blocker
CHD	Coronary heart disease
CHF	Congestive heart failure
CKD	Chronic Kidney Disease
COPD	Chronic Obstructive Pulmonary Disease
COR	Crude Odds Ratio
CVD	Cardiovascular Disease
DI	Drug Interaction
DCRH	Dill Chora Referral Hospital
DM	Diabetes Mellitus
DRP	Drug Related Problem
DTP	Drug Therapy Problem
FDA	Food and Drug Administration
HbA1c	Glycosylated Haemoglobin
HTN	Hypertension
JNC7	Seventh Report of Joint National Committee
LTCD	Long Term Chronic Care

MI	Myocardial Infarction
MMAS	Morsky Medication Adherence Scale
MRP	Medication Related Problem
NSAID	Non-Steroidal Anti-Inflammatory Drug
OPD	Outpatient Department
PUD	Peptic Ulcer Disease
SPSS	Statistical Package for Social Sciences

1. INTRODUCTION

1.1 Background

The intention of prescribing drug to patient is treatment, prophylaxis or diagnosis of medical condition; however these drugs may have negative effect on patient if not used appropriately. Drug therapy problem (DTP) is a term describing an event or circumstance involving drug therapy that actually or potentially interferes with desired health outcomes. There are several classifications for drug therapy problem According to Robert J.Cipolle (1), DTPs are classified into seven categories these including unnecessary drug therapy, need for additional drug therapy, ineffective drug, dosage too high, dosage too low ,adverse drug reaction and noncompliance. Pharmacist can play an important role in identifying, resolving and preventing potential DTP through careful pharmaceutical practice(2).

The occurrence of a DTP could prevent or delay patients from achieving desired therapeutic goals. An actual DTP is an event that has already occurred in patient where as potential DTP is an event that is likely to develop if clinical Pharmacist do not make appropriate intervention. DTP are significant challenge to health care provider and may affect morbidity, mortality and patient quality of life(1,2,3).

Hypertension usually means the value of blood pressure (BP) $\geq 140/90$ mmHg in the office. Hypertension is a very important disease from medical and social aspects. It is one of the most common diseases with constantly increasing tendency and the leading risk factor for cardiovascular and cerebrovascular mortality. Globally, hypertension affects over one billion people, seven million of whom die annually as a direct result of the disease. Worldwide, 13.5% of all premature deaths are attributable to high blood pressure. Elevated blood pressure accounts for two thirds and one-half of all cases of stroke and ischemic heart disease, respectively. Eighty percent of this burden occurred in low- and middle-income countries(3,4).

Although reliable, large-scale, population-based data on high blood pressure in sub-Saharan Africa are limited, recent studies provide important and worrisome findings in both epidemiology and clinical outcomes. Developing countries undergoing epidemiological transition face the double burden of communicable and noncommunicable diseases. Among the noncommunicable hypertension is one of

the most important treatable causes of morbidity and mortality. In developing countries, its morbidity and mortality are increasing from time to time due to a change in life style and sedentary life(5, 6).

In Ethiopia there is no sufficient data to know about the magnitude and determinants of hypertension however some studies that involved urban dwellers only indicate the prevalence of hypertension is increasing among the urban population of Ethiopia because of the increase in risk factors including smoking, obesity, and excessive use of alcohol and lack of exercise. Because of competing priorities from infectious diseases and nutritional problems the prevention and control of chronic diseases like hypertension is extremely low among developing nations including Ethiopia(7,8).

Although the recent advances in the diagnosis and treatment of hypertension have been shown to prevent cardiovascular diseases and to extend life, hypertension still remains an inadequately managed worldwide disease. Due to its high prevalence, severe complications and lack of adequate control; hypertension is a major health problem throughout the world. Hypertension is the most important modifiable risk factor for cardiovascular, cerebrovascular and renal disease. The levels of awareness, treatment and control of hypertension vary between countries. The levels of awareness, treatment and control of hypertension are particularly low in some economically developing countries (9,10).

Drug therapy of hypertension is proven to reduce blood pressure and the risk of associated adverse cardiovascular events. The global nature of the problem of hypertension requires that health-care providers screen for, and treat, elevated blood pressure. The burden of hypertension requires not only an increase in the awareness but Interventions aimed at improving drug therapy problems would provide a significant positive return on investment through primary prevention of risk factors and secondary prevention of adverse health outcomes(11-13).

1.2 Statement of the problem

Worldwide, 7.6 million premature deaths are attributed to high blood pressure. Hypertension was thought to be rare in Africa, but it is now recognized as one of the most important risk factor for cardiovascular diseases contributing for about 40% of diseases on the continent and has shown a rapid increase in prevalence affecting significant numbers of individuals in Sub-Saharan Africa. Although there is shortage of extensive data, 10.5% of the Ethiopian population has been estimated to have hypertension(3,8,14,15).

Hypertension is highly prevalent risk factor not only for cardiovascular morbidity and mortality but also for other end organ damage . Blood pressure and cardiovascular disease risk have a linear, continuous relationship, wherein increased blood pressure is associated with increased CVD risk and its inadequate treatment can lead to coronary heart disease , acute myocardial infarction, peripheral vascular disease , stroke, congestive heart failure and renal failure. The WHO has estimated that about 62% of cerebrovascular disease and 49% of ischemic heart disease burden worldwide are attributable to sub optimal control of blood pressure levels(16-18).

Hypertension is an established important risk factor for cardiovascular diseases and has been observed to be a leading contributor to burdens of mortality and morbidity both in developed and developing countries. Although the recent advances in the diagnosis and treatment of hypertension have been shown to prevent cardiovascular diseases and to extend life, hypertension still remains an inadequately managed worldwide disease. Even in developed countries, 62–67% of hypertensive patients being treated have no adequate control of their diseases. The corresponding number in developing countries varies from 66 to 70%(1,2,3,9,19).

Numbers of medications are proven to reduce blood pressure and the risk of associated adverse cardiovascular events. Although safe and effective drugs and evidence-based treatment guidelines are available, the management of hypertension remains sub-optimal, globally the proportion of hypertensive individuals whose condition is treated or controlled with medication remains low(20).

The availability of large number of medicines, the constant efflux of new information and extensive use of medicines in both institutionalized and ambulatory care settings present a fertile ground for occurrence of drug therapy problems. Drug related problems are of a major concern in health care because of increased cost, morbidity and mortality and are also the dominant reasons for admission. It also compromises the efforts of the healthcare system, policy makers and health care professionals in improving the health of populations(22,23).

A review of the literature concerning DTPs has shown that 28 % of all emergency department visits were medication-related, including adverse events of which 70%-90% were preventable. As a result, substantial numbers of patients do not get the maximum benefit of medical treatment, resulting in poor health outcomes, lower quality of life, increased health care costs and erodes public confidence in health systems(16,24,25).

Drug therapy problems among hypertensive which include non-compliance, ADRs, improper drug selection and drug interactions could prevent or delay patients from achieving desired therapeutic goals. Studies worldwide indicate that more than half of hypertensive patients on treatment have blood pressures over 140/90 mm Hg threshold. Unnecessary over-prescription of drugs, substantial worsening of diseases, avoidable increases in hospital admission rates, and longer hospital stays leading to a significant medical burden (25,26).

Drug therapy problem is one of the biggest obstacles in therapeutic control of blood pressure. The high prevalence and poor outcomes of hypertension treatment are alarming, and drug use problems have become a major problem which causes medical and psychological complications of the disease, reduces patients' quality of life. Hence Appropriate treatment choices and optimizing doses of medicines prescribed are vital in ensuring the success of therapy clearl interventions to improve drug therapy problems are needed to overcome the harms imposed by the problem. It is critical to understand the complex reasons for drug therapy problem and to identify those that are modifiable in hypertensive patients(28,29,30,31). Thus, the aim of study is to assess the prevalence, pattern, and predictors contributing to DTPs among hypertensive patients at Dill Chora Referral Hospital.

1.3. Significance of the study

Drug therapy problem will lead health care professionals to optimize drug therapy that may influence health expenses; save lives, improves health, reduces morbidity and increases quality of life. Awareness of drugs carrying a high risk for DTPs, are important elements of drug therapy and may contribute to diminishing drug -related morbidity and mortality. The barrier to blood pressure control is failure to appropriately titrate medications and/or initiate other interventions when BP remains above target control. Intensive follow-up to assess therapeutic response and adverse effects is most important. Since early identification of the types and patterns of DRPs and the factors associated to them may enhance the prevention and management of DTPs. Categorizing and identifying DTPs will also enable the practitioner in collaboration with the patient to construct a better care plan.

In Ethiopia, particularly in the study area, little is known about the DTP status and associated factors among the target population as studies are scarce in this regard. Generally the result of this study will have good impact on the clinical practice among hypertensive patients and other patients on chronic follow up The finding can be used to provide pharmacy staffs with concrete information on the type and frequency of drug therapy problem experienced by hypertensive patients and increase the awareness of pharmacy staffs so that whenever they meet a patient with hypertension they will be alert. The findings of the study will serve as base line for further studies or serve as secondary data for other studies. The finding will be used as an input in movement to strengthen the pharmaceutical care service in the hospital and to broader national level. Identifying risk factors of DTP is important in that it creates opportunities for designing effective intervention to mitigate problems related to drug therapy there by maximizing patient care.

2. LITERATURE REVIEW

Many studies have shown drug-related problems (DRPs) to be very common in primary care and in hospital settings. Among studies which focused on DTP in primary care which are cross-sectional in nature and others had been conducted both in Ethiopia and abroad which tried to show consequence of drug related problem on health outcome.

2.1 Prevalence characteristics and risk factors of drug therapy problem

A study conducted in Malaysia 2009 among T2DM patients with hypertension, the study include two hundred patients showed that there was a total of 387 DRPs identified. Among these patients, 90.5% had at least one DRP, averaging 1.9 ± 1.2 problems per patient. The most common DRPs encountered were insufficient awareness of health and diseases (26%), drug choice problems (23%), dosing problems (16%) and drug interactions (16%) the most implicated drugs were aspirin, clopidogrel, simvastatin, amlodipine and metformin. The six domains of DRPs found to have statistically significant associations were renal impairment, polypharmacy, cardiovascular disease, elderly status, and duration of hospital stay. (32).

A study which was conducted to compare the drug therapy problem in two samples, In the Minnesota Sample the pharmaceutical care practitioners identified and resolved a total of 3,631 drug therapy problems during the care of these 1,598 patients (77) of patients experienced one or more drug therapy problems at some time during their care. The most frequent category of drug therapy problems in the Minnesota Sample is required the addition of new drug therapy (59%) to the patient's regimen. The majority of these were indicated to prevent the onset of a new medical condition(31).

A cross-sectional study performed which was to determine the prevalence and predictors of MRPs among elderly patients enrolled in this Florida long term care service showed that potentially untreated indication was found in (43.7%) of patients. The most prevalent untreated indications for specific diagnoses included: missing bronchodilator therapy of any kind for patients with COPD (79.2%), no long-acting bronchodilator medication for patients with COPD (58.3%), absence of 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitor ("statin") therapy for patients with

CHD (53.8%), missing an ACE inhibitor or angiotensin II receptor blocker (ARB) for patients with CHF (47.8%), and lack of immediate release nitrates for patients with CHD (46.2%). Other potentially untreated indications detected were: missing aspirin or beta-blocker therapy in patients with CHD (38.5%), missing aspirin or ACE inhibitor/ARB therapy in patients with DM (22.6%), no short acting bronchodilator on the medication profile of patients with COPD (20.8%), missing beta-blocker therapy in patients with CHF (17.4%), and missing aspirin therapy in patients with cerebrovascular disease (15.0%) and the factor having the greatest influence on MRPs in this study was number of medications, presence/absence of dementia, and age (32).

An observational prospective study conducted in India 2013 to analyse and identify the various parameters of DRP among hypertensive patients with coronary heart disease outpatient and inpatient department 50 prescriptions were identified for this study out of which 75 numbers of clinical DRP and 15 technical DRP were observed. The elderly subjects were specially observed and no significant difference and categorization and causes of DRP in hypertensive subjects associated with CHD (33).

In another prospective descriptive study, conducted in Thailand in 2006 in which 147 patients were enrolled; Fifty seven patients (38.8 percent) had drug therapy problems. In total, 81 problems were found. The most common problem was non-compliance (30.9 %), followed by problem of adverse drug reactions (22.2 %). Dosage too low and inappropriate lifestyle came in the third rank in equal frequency (13.5 %) (34).

A cross-sectional, descriptive and exploratory study conducted in Qatar to describe the extent and types of drug related problems in 15 medication review shows that Overall, a total of 175 DRPs were identified with an average of 3.4 DRPs per patient. The most commonly encountered DRPs were: non-adherence to drug therapy (31 %), need for education and counseling (23 %), and adverse drug reactions (21 %). Patients receiving six or more medication had significantly higher number of DRPs compared to those receiving three medication (35).

A prospective observational study conducted in Palestine to examine the nature and frequency of drug related problems among 212 hospitalized patients shows that incorrect dosage regimen (22.2%) was the most prevalent followed by drug-drug interaction (19.4%) the study also shows number of medications and number of medical conditions independently predicted the number of DRPs (36).

A study conducted in Nigeria in 2014 among T2DM patients the study include 399 patients showed that there was a total of 792 drug therapy problems were identified, averaging 2.1(\pm 1.4) problems per patient. There were more males (52.1%) than females (47.9%) diabetics. Mean age of the patients was 65(\pm 12.4) years, ranging from 35 to 91 years. 49(12.4%) of the patients experienced at least one episode of hypoglycemia. Non-adherence was the most common DTP at 26.7% while polypharmacy was identified as a major factor that contributed to DTP among the patients(37).

Cross sectional study conducted in Ethiopia 2014 at Adama Hospital Medical College in which convenient sampling method was used and a total of 192 hypertensive patients were included in the study. In this study a total of 452 drug therapy problems were identified. The most common drug therapy problem identified in this study was drug interaction (58.7%), followed by non-adherence and adverse drug interaction constituting 19.5% and 18.6% respectively. Under dose accounts only 0.9% of all drug therapy identified. Marital status, number of drugs and number of co morbidities significantly affect drug therapy problems. The study also showed that 80.7% of the patients in the study have drug therapy problems. Number of complications and number of drugs significantly affect drug therapy problems(29).

A study which was conducted in Ethiopia which was hospital based crosssectional to assess drug related problem on 257 patients shows 189 (73.5%) had DRPs and From the six classes of DRPs studied, 103 (32.6%) cases related to untreated indication or need additional drug therapy, and 49 (15.5%) cases 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. Independent factors which predicted the occurrence of DRPs in the study population were sex, age, polypharmacy, and clinically significant potential drug-drug interactions(38).

A Hospital based study conducted in Ethiopia Felege Hiwot Referral hospital to characterize the prevalence of drug therapy problem on patients admitted with cardiovascular disease/s shows that the most common cardiovascular disease encountered were hypertensive heart disease (26, 32.9%), rheumatic heart

disease (24, 31.6%) and ,functional heart failure and cor pulmonalae (14, 18.4%). A total of 105 number of DTPs were identified with the mean number of DTP was $1.38 + 0.8$. Most of the patients had drug therapy problem, of which indication related problems constituted the highest part(39).

2.2. Review on adherence on antihypertensive agents

A number of studies have documented the occurrence of non-adherence among patients being treated for hypertension. Seriousness of non-adherence as a problem in the control of blood pressure has been shown by many studies which is one type of drug therapy problem among hypertensive patients.

A cross-sectional study conducted in china among hypertensive patients on follow up in outpatient clinic in which enrolled 1114 patients showed 34.9 had poor adherence to antihypertensive agents and younger age, shorter duration of antihypertensive agent used, job status being employed and poor or very poor self-perceived health status were negatively associated with drug adherence(40).

A cross-sectional study conducted in Uzbekistan among 209 patients hypertension at Medical Institute in 2012 shows the BP control rate and drug adherence of the patients were suboptimal (24.4% and 36.8%, respectively) and 35.5% had inadequate knowledge about hypertension and drug adherence is significantly associated with BP control Both drug adherence and BP control rate were suboptimal and significantly associated with hypertension knowledge(12).

A study conducted in Nigeria among hypertensive patients to assess compliance with drug treatment showed non compliance was observed in 45.8 % of the respondents and good compliance among the remainder. Poor compliance was found to be mainly due to ignorance on need for regular treatment (32.7%), lack of funds to purchase drugs (32.7%) and side effects of drugs (12.1%). Patients with formal education, and higher monthly income were more compliant to treatment. In addition, those on single drugs were more compliant compared to those on two or more drugs. Poor compliance was found to be mainly due to ignorance and lack of funds to purchase drugs(41).

In study conducted in Nigeria which was cross sectional study on randomly sampled one hundred and fifty two (152) outpatients suffering from non-co morbid hypertension, visiting the consultant outpatient clinic of the cardiology unit of the department of medicine, University of Maiduguri Teaching Hospital (UMTH), Maiduguri, Borno state in 2012, were interviewed using a self-administered pre-tested structured, mostly closed ended questionnaire. Adherence was measured on a 12-point scale, recorded a mean score of 9.37 +1.22. The study participants had a mean age of 49.29 +1.04 years. The adherence level was 85.5%. The study shows a significant association between adherence and age, marital status, tribe, state of origin, cost of antihypertensive medications, number of antihypertensive medications, age/gender with $P < 0.01$. Major reasons for non-adherence were feeling worse (side effects of the antihypertensive medications), and feeling better with $P < 0.01$ (30).

A Cross sectional exclusively study conducted at Dessie referral hospital in 2012. A total of hundred hypertensive patients and the overall incidence of anti-hypertensive medication non adherence was 26%. Among Factors associated with non adherence were health system and health care provider poor interaction with patient and therapy factors like frustration and unwanted effect of the medication in the long run (25).

In another Institution based cross sectional study which was conducted in Gondar hospital. Systematic sampling technique was used to select 384 participants. About 35.4% of the study participants were found to be non adherent to their treatment. Sex , knowledge about HTN and its treatment, distance from the hospital and co morbidity variables were found significantly associated with treatment adherence(42).

A Facility based cross sectional study conducted among patients on follow up at Adama referral hospital in 2013 shows that 40.5% of the study participants were found to be nonadherent to their treatment. Age group, Lack of information and presence comorbidities,were found to have statistically significant association with adherence. Large segment of patients in this particular setup did not seem to adhere to their antihypertensive treatment(26).

2.3. Prescribing pattern of antihypertensive medication

A study conducted in India in 2011, in this study in which 400 prescriptions were collected to evaluate the prescribing pattern, shows that monotherapy ACE-inhibitors (38.25%) were the most commonly prescribed antihypertensive followed by calcium channel blockers (19.25%), diuretics (13.25%). Among combination therapy often 2 drug combinations were prescribed, the most common combination was (5%), ACEI + CCB followed by (3.5%) beta-blocker + CCB (43).

A study conducted in India in 2012 which was a retrospective randomized non interventional study Out of 100 drugs prescribed for diabetic hypertensive patients most commonly used category of drugs were angiotensin receptor blockers (41%), calcium channel blockers (21%) and beta blocker(13%) and the most commonly prescribed antihypertensive drug were telmisartan (44) .

2.1. Conceptual framework

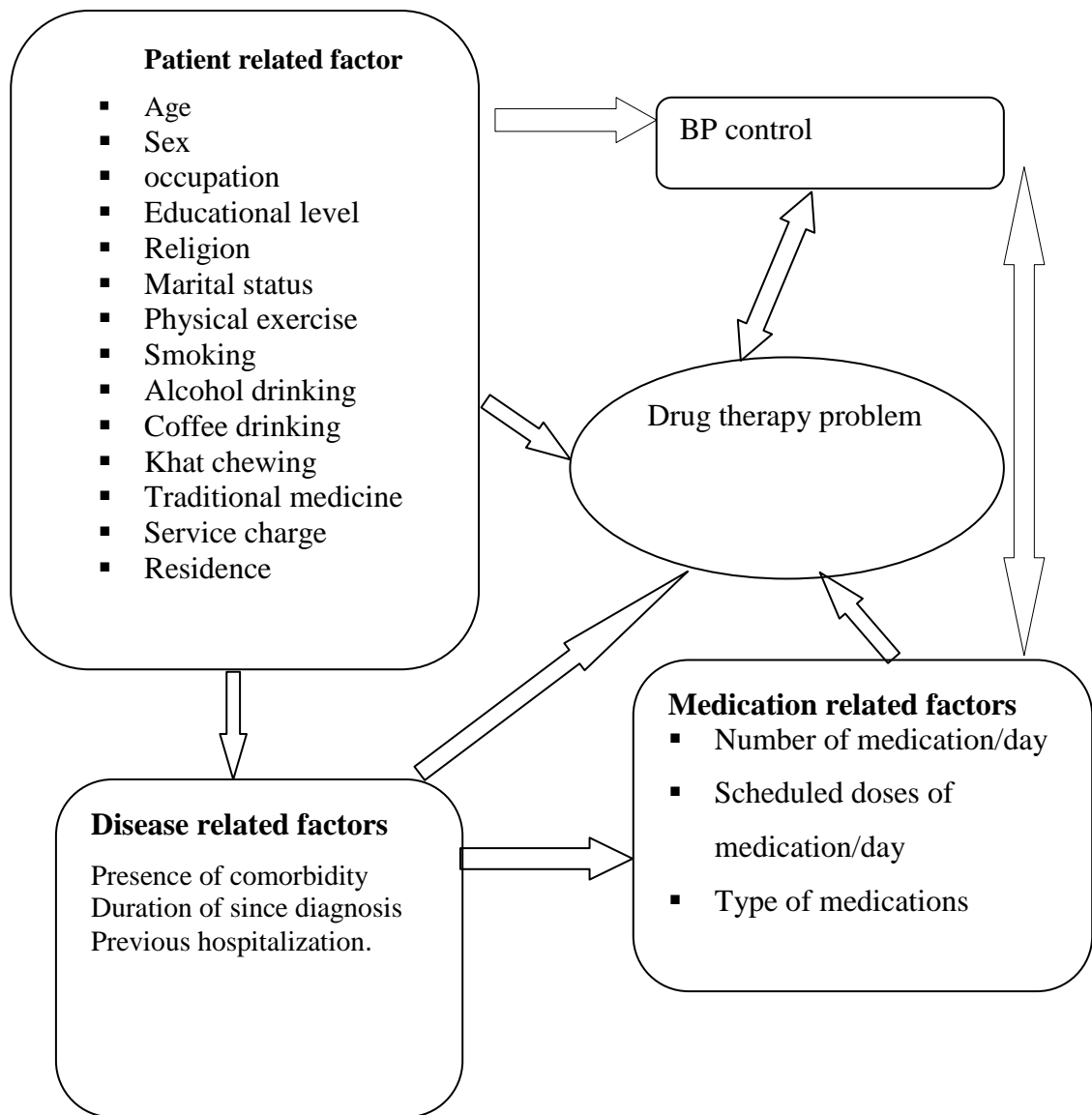


Figure 1: conceptual frame work showing factors associated with drug therapy problems.

3. OBJECTIVE OF THE STUDY

3.1. General objective

- To assess drug-therapy Problems and their predictors among hypertensive patients on follow up at Dill Chora Referral Hospital.

3.2 Specific objectives

- To determine the prevalence of drug-therapy problems among hypertensive patients.
- To determine the pattern of drug-therapy problems among hypertensive patients.
- To identify predictors of drug-therapy problems among hypertensive patients.

4. METHOD AND MATERIALS

4.1. Study area and period

The study was conducted in Dire Dawa city which is located 565 Km east of Addis Ababa. Dire Dawa is one of the federal city administrations other than Addis Ababa. Dire Dawa city has different governmental health facilities including one Referral Hospital, 15 Health centres and 37 Health posts and three private General Hospitals and more than fifteen clinics of different levels.

Dill Chora hospital is the only governmental hospital in the city was established in 1952. It gives health care service to the people of Dire Dawa and the surrounding areas .The hospital has four major (Medical, Surgery, Gynecology/obstetrics, and pediatrics) chronic care unit and five other departments. It runs an annual governmental budget of 25.06 million birr with bed capacity of 450 and a total of more than 550 staffs of both supportive and professional. The study was conducted from 10, March to 10, April in the chronic care unit of the hospital.

4.2. Study design

Hospital based cross-sectional study design

4.3. Population

4.3.1 Source population

All hypertensive patients who were on follow up and treatment in DCRH

4.3.2 Study population

All hypertensive patients who came to DCRH at chronic care unit during data collection period and fulfilled the inclusion criteria.

4.3.3. Eligibility criteria

4.3.3.1. Inclusion criteria

- Patients diagnosed with hypertension and who have been on antihypertensive medication for past three month. Hypertensive patients who were willing to respond, and with age greater than 18 years were included.

4.3.3.2. Exclusion criteria

- Pregnancy induced hypertension, Patients who had not started anti hypertensive medication, patients who were not willing to participate and patients whose medical record was lost during the study period were excluded.

4.4 Sample size determination and sampling technique

4.4.1 Sample size

The sample size for the study was determined using single population proportion formula considering the following assumption. 95% confidence level, finding that prevalence rate estimated (80%) with 5% level of significance(45).

$$n = \frac{(Z_{1-\alpha/2})^2 P (1-P)}{d^2} = \frac{(1.96)^2 (0.8 \times 0.2)}{(0.05)^2} = 246$$

Where; n= sample required

Z= critical value for 95% confidence interval (1.96)

D= margin of error (5%) = 0.05 P= prevalence rate = 80% (Hussein et al)

With the above inputs sample size equals to 246

Considering 10% of non-response rate, therefore n was **271**.

4.4.2 Sampling technique

In this study a non probability convenient sampling technique was used. Patients were enrolled consecutively to the study based on their arrival at chronic care unit until the required sample is obtained. All eligible patients who were willing to participate during the study period were included.

4.5 study variables

4.5.1 Dependent variable

- ❖ Drug therapy problem.

4.5.2 Independent variable

- ❖ Socio-demographic characteristics and lifestyle
 - Age
 - Sex
 - Occupation
 - Educational status

- Religion
- Marital status
- Cigarette smoking
- Alcohol taking
- Khat chewing
- Coffee
- ❖ Disease related variables
 - Presence of comorbidity
 - Duration of since diagnosis
 - Previous hospitalization
 - Blood pressure status
- ❖ Medication related variables
 - Number of medication
 - Scheduled doses of medication
- Physical exercise
- Traditional medicine
- Residence
- Service charge

4.6. Data collection tool and procedure

4.6.1 Data collection tool

Data collection was undertaken from 10 March to 10 April, 2015 in DCRH. Data were collected through patient's medical record reviews including prescriptions using a prepared standard checklist and pre-tested questionnaire by pharmacist. The content of the checklist include current medication and Clinical characteristics such as vital signs, duration of hypertension, presence of complications, presence of comorbidities, relevant laboratory results and concurrent medications. Data on socio demographic social history were collected through face-to-face interviews by using pre-tested questionnaire, which was initially prepared in English, and translated into Amharic version. Adherence was measured using the eight-item Morisky Medication Adherence Scale translated into Amharic version for the present study. Data were collected upon the supervision of principal investigator.

4.6.2 DTP identification and categorization

Data collectors interviewed the patient and reviewed the patient chart and prescription. The DTP evaluation tool was prepared based on the categories and reasons for DTP by Cipolle et al (1). DTP were identified by evaluating the appropriateness of prescriptions and reviewing patients' medical records by assessing the patients drug related need in terms of indication, effectiveness, safety and compliance. For identification of DTPs reference used include JNC7 and Ethiopian standard treatment guideline 2014, American diabetic association and other relevant guidelines was used.

4.7 Standardized and operational definition of terms

Hypertensive patient: is patient with high blood pressure (>140/80) and has already started anti-hypertensive medication.

DTP: is any undesirable event experienced by a patient which involves, or is suspected to involve, drug therapy, and that interferes with achieving the desired goals of therapy, which can be identified using JNC7 and Ethiopian standard treatment guideline 2014, American diabetic association except non adherence. In this study it includes unnecessary drug therapy, need for additional drug therapy ineffective drug, low dose and high dose and non-adherence.

Unnecessary drug therapy: defined as there is no valid medical indication for the drug therapy at this time, multiple drug products are being used for a condition that requires single drug therapy, the medical condition is more appropriately treated with nondrug therapy, Drug therapy is being taken to treat an avoidable adverse reaction associated with another medication, Drug abuse, alcohol use, or smoking is causing the problem.

Need for additional drug therapy: A medical condition requires the initiation of drug therapy, Preventive drug therapy is required to reduce the risk of developing a new condition, a medical condition requires additional pharmacotherapy to attain synergistic or additive effects.

Ineffective drug: The drug is not the most effective for the medical problem, the medical condition is refractory to the drug product, the dosage form of the drug product is inappropriate, and the drug product is not an effective product for the indication being treated.

Dosage too low: Dose is too low to produce the desired response, the duration of drug therapy is too short to produce the desired response, and a drug interaction reduces the amount of active drug available,

Dosage too high: Dose is too high, the dosing frequency is too short, the duration of drug therapy is too long, a drug interaction occurs resulting in a toxic reaction to the drug product, the dose of the drug was administered too rapidly.

Non adherence: Adherence was determined by MMAS-8 version translated for this study. The patients were considered non adherent when they had a score equal or greater than 3 at the MMAS-8.

Drug interactions are defined as interactions that potentially cause harm to patient and are well documented or can cause moderate harm without well documented studies.

Co morbidity: the co-existence of one or more additional conditions in persons with a specified index medical condition.

Physical activity: Physical activity categorized according to the number of episodes of exercise undertaken per week. A person who reports regular aerobic exercise of at least 30 min for every ≥ 3 times per week; was considered physically active.

Smoker: a person who smokes tobacco regularly was considers as smoker.

Alcohol drinker: a person having up to two drinks per day was considers as alcohol drinker.

Traditional medicine use: a person who use herbal preparation as maintenance of health as well as prevention improvement or treatment for hypertension.

4.8. Data processing and analysis

Data were checked for its completeness every day and cleaned and coded by the principal investigator then coded and entered using SPSS 20.0 for statistical analysis. Data were described and summarized using tables and graphs. Categorical variables were described by frequencies and percentages. Mean & Standard deviation of all continuous variables were calculated. Bi-variate and multivariate logistic regression analysis with 95% confidence interval was employed for categorical variables to infer associations and predictions. Initially, each variable was entered into a logistic regression model as the only independent variable, with dependent variable in order to calculate crude Odds ratio for each exposure variable. Bivariate analysis was done to determine presence of statistical significant association between explanatory variables and the outcome variable. A multivariate logistic regression model was performed to identify independently associated factors. All explanatory variables that are associated with the outcome variable in bivariate analyses with a P-value of 0.25 or less were fitted in the final logistic models. Those variables whose p-value ($p < 0.05$) were considered as statistically significant and

independent predictor of DTP among hypertensive patients on follow up in Dill chora referral hospital.

4.9. Data quality assurance

In order to assure the quality of data; training of data collectors, pre-testing of questionnaire and reviewing of filled questionnaire by supervisor and the principal investigator was undertaken. In addition, the questionnaire was pre-tested during the training of data collectors in order to increase the validity and reliability of the responses. Based on the findings from the pre-testing the questionnaire was modified. Clinical characteristics such as such as relevant vital signs duration of hypertension, presence of complications, presence of comorbidities, laboratory results and concurrent medications were also carefully collected from patients' folders by the checklist which was pre-tested during the training of data collectors in order to increase the validity and reliability of the collected data.

4.10. Ethical consideration

Prior to data collection, appropriate ethical clearance was obtained from Jimma University, college of Health sciences Ethical Review Committee. During data collection, each respondent was informed about the purpose of the study and written consent was taken from each patient. The respondents were told that they have the right to be involved or not to be involved in the study. In order to assure confidentiality respondent's name was not written on the questionnaire form. Instead of name, code was used. Anyone who was not willing to participate was excluded from the study.

4.11. Result disseminations

The result of the study will be disseminated to Jimma University College of health, science, pharmacy department and the major findings will be communicated to Dire Dawa Regional Health Bureau. The result will be presented during different seminars, meeting, scientific conferences and workshops. Moreover, the finding will also be sent for publications.

5. RESULT

5.1. Socio-demographic and lifestyle characteristics of study subjects

A total of 271 hypertensive patients were enrolled in this study. The mean (SD) age of patient was 57.73 ± 12.13 years old and ranged from 25 and 94. One hundred sixty three (60.1 %) were females .Majority of the participants (74.9%) were married. About 49% were illiterates and nearly 47% participants were Unemployed. Two hundred eight (76.8%) were orthodoxy by religion .Only 7.4% patients practiced some regular physical activity. Smoking and alcohol consumption were reported by 12.9% and 12.5% of patients, respectively. One hundred sixty (59 %) of the study participants get free access to medication while others were not. (table 1)Socio demographic Characteristics of the study subjects & table 2 lifestyle characteristic of the study subjects.

Table 1: Socio demographic characteristic of the study participants (n = 271), Dill Chora Referral Hospital Dire Dawa Ethiopia, 2015

Characteristics	Category	n (%)
Age	19-64	85 (31.34)
	≥65	186 (68.66)
Sex	Male	108 (39.90)
	Female	163 (60.10)
Occupation	Retired	68 (25.10)
	Unemployed	127 (46.90)
	Merchant	28 (10.30)
	Farmer	4 (1.50)
	Employee	44 (16.20)
Educational status	Illiterate	132 (48.70)
	Primary Education	61 (22.50)
	Secondary Education	59 (21.80)
	College and University	19 (7)
Religion	Orthodox	208 (76.80)
	Muslim	56 (20.70)
	Protestant	7 (2.60)
Marital Status	Married	203 (74.90)
	Single	32 (11.80)
	Divorced	4 (1.50)
	Widowed	32 (11.80)
Residence	Urban	261 (96.30)
	Rural	10 (3.70)

Table 2: Lifestyle characteristic of the study participants (n = 271), Dill Chora Referral Hospital Dire Dawa Ethiopia, 2015

Characteristics	Yes	No
Physical activity	20(7.40%)	251(92.60%)
Smoker	35(12.90%)	236(87.10%)
Alcohol	34(12.50%)	237(87.50%)
Khat	64(23.60%)	207(76.40%)
Coffee	173(63.80%)	98(36.20%)
Traditional medicine	33(12.20%)	238(87.80%)
Free service charge	160(59.04%)	111(40.96%)

5.2. Clinical Characteristic of the patients

In this study near half (49.40%) of the respondents had no any comorbidity. The most frequently reported comorbid condition was diabetes 95 (35.10%), and about 137(50.5%) had at least one comorbidity. About 111(40.90%) respondents were hypertensive for one up to three years and 61(23.20%) had at least one previous history of hospitalization since diagnosis. Overall, the mean systolic BP was 141.33 ± 16.20 mmHg and the mean diastolic BP was 87.01 ± 9.32 mmHg, with 36.20% (98/271) patients attaining controlled BP according to JNC 7 guidelines.(table 3) Among patients with no comorbidity, 41.80% had their BP controlled, whereas among patients with diabetes mellitus only 23% attained while patients with stroke 56% controlled BP.

Table 3: Clinical Characteristic of the study participants (n = 271), Dill Chora Referral Hospital Dire Dawa Ethiopia, 2015

Characteristics	n	(%)
Presence of co morbidity		
Yes	137	(50.55)
No	134	(49.45)
Type of co morbidity		
Diabetes mellitus	95	(35.10)
Peptic ulcer disease	10	(3.70)
Stroke	9	(3.30)
Heart failure	5	(1.80)
Chronic kidney disease	4	(1.50)
Asthma	4	(1.50)
Gouty arthritis	3	(1.10)
Other*	7	(2.60)
Duration since diagnosis in year		
Less than 1	23	(8.50)
1-3	111	(40.90)
4-6	100	(37.00)
7-9	19	(7.00)
Above 10	18	(6.60)
BP status		
controlled	98	(36.20)
Uncontrolled	173	(63.80)
Previous hospitalization since diagnosis		
None	193	(71.22)
Once	63	(23.25)
Twice and more	15	(5.53)

Others * HIV (2) UTI (2) soft skin infection (2) and Diarrhoea (1)

5.3. Pattern of antihypertensive medication use (n=271)

In this study the average number of medications was 2.57 ± 1.05 and the number ranged from 1 to 5 and the average number of anti-hypertension medications prescribed per patient was 1.74 ± 0.64 . The most frequently prescribed antihypertensive medications were hydrochlorothiazide (41.43%), Enalapril (28.96%), Nifedipine (19.66%). Among patients on follow-up 101 (37.30%) patients were on mono therapy and the rest 140(51.60%) and 30(11.10%) received a dual and triple therapy respectively. The most frequently used drug classes were Diuretics ACE inhibitors and calcium channel blocker while hydrochlorothiazide, Enalapril and Nifedipine were the most widely used agents representing these classes, respectively. In mono therapy, ACE inhibitor (Enalapril) was most commonly prescribed (n=42; 41.58 % of mono therapy) For combination therapy, the dual therapy ACE inhibitors plus thiazide(n=70;48.61% of the dual therapy) had the highest frequency and ACE inhibitors, thiazide and beta blockers (n=17;65.38% of triple therapy) was more widely used triple therapy.(table 4)for patients who have diabetes mellitus combination therapy, metformin plus glibenclamide (16.60 %) appeared to be the most common used combination. (table 4)

Table 4: Pattern of antihypertensive medication use among the study participants (n = 271), Dill Chora Referral Hospital, Dire Dawa, Ethiopia, 2015

Characteristics		n	(%)
Medications prescribed	Hydrochlorthiazide	196	(41.43)
	Enalapril	137	(28.96)
	Nifedipine	93	(19.66)
	Atenolol	36	(7.62)
	Spironolactone	5	(1.06)
	Furosemide	4	(0.85)
	others*	2	(0.42)
	Total drugs	471	(100)
Monotherapy	Enalapril	42	(41.58)
	Hydrochlorhiazide	36	(35.64)
	Nifedipine	21	(20.79)
	Atenolol	2	(1.98)
	Total	101	(100)
Dual therapy	Enalapril +Hydrochlorthiazide	70	(50)
	Nifedipine + Hydrochlorthiazide	55	(39.29)
	Atenolol +Hydrochlorthiazide	8	(5.71)
	Others**	7	(5)
	Total	140	(100)
Triple therapy	Enalapril +Hydrochlorthiazide+Atenolol	17	(56.67)
	Nifedipine + Hydrochlorthiazide+Atenolol	7	(23.33)
	Enalapril +Nifedipine+ Hydrochlorthiazide	4	(13.33)
	Enalapril +Spironolactone +Furosemide	2	(6.67)
	Total	30	(100)

Others*Methyldopa(1), Propranolol(1)Others**Enalapril+Atenolol(3),Nifedipine+Spironolacton (2)Enalapril+Furosemide(1) Spirinolactone +Furosemide(1),

Table 5: Pattern of concurrent medication use among study participants (n = 271), Dill Chora Referral Hospital, Dire Dawa, Ethiopia, 2015

Characteristics	n (%)
Antidiabetic medication	
Metformin + glibenclamide	45 (47.36)
NPH alone	17 (17.89)
Metformin alone	15 (15.78)
Glibenclamide alone	10 (10.53)
NPH + Metformin	8 (8.44)
Total	95 (100)
NSAIDS	
Diclofenac	13 (48.15)
Aspirin	11 (40.75)
Indomethacin	2 (7.4)
Ibuprofen	1 (3.7)
Total	27 (100)
Others Medications	
Omperazole	13 (28.90)
Neurobin	10 (22.22)
Multivitamin	7 (15.55)
Antibiotics(norfloxacillin,cloxacillin amoxicillin)	5 (11.11)
Digoxin	3 (6.67)
Cough syrup	3 (6.67)
Salbutamol	3 (6.67)
Simvastatin	1 (2.21)
Total	45 (100)

5.4. Prevalence, type and number of Drug therapy problem among hypertensive patients on follow up in Dill Chora Referral Hospital

In this study a total of 378 DTPs were identified in 193 patients. About 193(71.20%) of the patients had at least one DTP and the mean was 1.39 ± 1.28 problems ranged from 1 to 5 DTPs (table 6). The most frequent category of DTP in this study was need additional drug therapy accounting for 236 (62.43 %) and the majority of these were indicated to prevent the onset of new medical condition (preventive therapy).The second most prevalent DTP in this study was compliance related 124(32.80%) (see table 6).

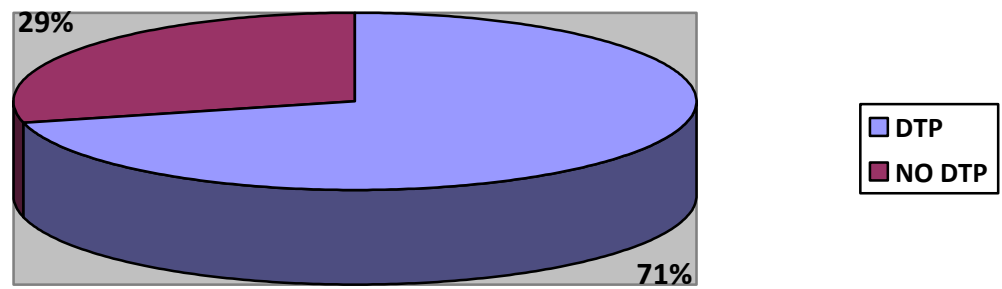


Figure 2. Shows the prevalence of DTP among the study participants (n = 271), Dill Chora Referral Hospital, Dire Dawa, Ethiopia, 2015

Table 6: Type of drug therapy problems identified among hypertensive patients on follow up in Dill Chora Hospital Dire Dawa Ethiopia, 2015

Category of DTP	N=378 n (%)		Reason for DTP
Unnecessary drug	5	1.33	No valid medical indication(2) Multiple drug products are used(3)
Need additional drug	236	62.43	Preventive drug therapy required (141) synergistic effect required(91) Untreated indication(4)
Ineffective drug	7	1.86	Not effective for medical condition(4) More effective drug available(3)
Dosage too low	3	0.79	Too low to produce the desired response(3)
Dosage too high	3	0.79	The dose given is too high (3)
Non compliance	124	32.80	Forgetfulness(101) Feel worse(23)
Total	378	100	

Table 7: Number of drug therapy problem among hypertensive patients on follow up in Dill Chora Hospital Dire Dawa 2015 (N = 271)

Number of DTP	No of patients with DTP n (%)	
Zero	78	(28.80)
One	95	(49.20)
Two	38	(19.60)
Three	40	(20.70)
Four	18	(9.00)
Five	03	(1.50)
Total	271	100

5.5. Risk factors for drug therapy problem among hypertensive patients on follow up

The presence of drug therapy problem was assessed based on socio-demographic characteristics of the study subjects. Age, sex, marital status, educational status, religion, occupation and residence were taken as study variables to see the outcome of the dependent variable. The presence of drug therapy problem was statistically significantly different among occupation categories. However, there was no difference among Age, sex, marital status; educational status religion and residence (table 8).

Table 8: Bivariant analysis of sociodemographic factors with drug therapy problem among hypertensive patients on follow up by using binary logistic regression in Dill Chora Hospital 2015 (N = 271)

Characteristics	Drug therapy problem		Total	COR (95% CI)	P-value
	No (N/%)	Yes (N/%)			
Age					
< 65 old year	20(23.50)	65(76.50)	85	1	
≥ 65 old year	58(31.20)	128(68.80)	186	0.68(0.38, 1.22)	0.198
Sex					
Male	32(11.80)	76(28.04)	108	1	
Female	46 (16.97)	117(43.17)	163	1.07(0.63, 1.83)	0.802
Marital status					
Married	55(27.10)	148(72.90)	203	1	
Single	13(40.60)	19(59.40)	32	0.90(0.38, 2.12)	0.804
Divorced	2(50)	2(50)	4	0.49(0.17, 1.42)	0.186
Widowed	8(25)	24(75)	32	0.33(0.04, 2.77)	0.309
Education status					
Illiterate	38(28.80)	94(71.20)	132	1	
Primary school	17(27.90)	44(72.10)	61	0.46(0.13, 1.68)	0.243
Secondary school	20(33.90)	39(66.10)	59	0.49(0.13, 1.88)	0.295
≥higher education	3(15.80)	16(84.20)	19	0.366(0.095, 1.404)	0.143
Religion					
Muslim	22(39.30)	34(60.70)	56	1	
Orthodox	53(25.5)	155(74.50)	208	1.89(1.02, 3.52)	0.064
Protestant	3(42.9)	4(57.10)	7	0.86(0.18, 4.23)	0.856
Occupation					
Retired	14(20.60)	54(79.40)	68	1	
Unemployed	36(28.30)	91(71.70)	127	0.66(0.32, 1.32)	0.066

Merchant	14(50.00)	14(50.00)	28	0.26(0.10, 0.67)	0.005
Farmer	2(50.00)	2(50.00)	4	0.26(0.03, 2.00)	0.196
Employee	12(27.30)	32(72.70)	44	0.69(0.28, 1.68)	0.414
Residence					
Urban	74(28.40)	187(71.60)	261	1	
Rural	4(40)	6(60)	10	0.59(0.16, 2.16)	0.429

COR: crude odds ratio

Presence of drug therapy problem was also assessed based on life style. The presence of drug therapy problem was significant among service charge categories. However, there was no difference among Physical activity, cigarette smoking, alcohol drinking khat chewing drinking coffee and using traditional medicine as compared to their counterparts.(see table 9)

Table 9: Bivariant analysis of life style factors with drug therapy problem among hypertensive patients on follow up by using binary logistic regression in Dill Chora Hospital 2015 (N = 271)

Characteristics	Drug therapy problem		Total	COR (95% CI)	P-value
	No (N/%)	Yes (N/%)			
Physical activity					
No	71 (28.30)	180(71.70)	163	1	
Yes	7(35)	13(65)	20	0.73(0.28, 1.91)	0.525
Smoker					
No	71(30.10)	165(69.90)	236	1	
Yes	7(20)	28(80)	35	1.72(0.72, 4.12)	0.223
Alcohol					
No	72(30.4)	165(69.60)	237	1	
Yes	6(17.6)	28(82.40)	34	2.04(0.81, 5.13)	0.131
Khat					
No	58(28)	149(72)	207	1	
Yes	20(31.30)	44(68.80)	64	1.89(0.47, 1.58)	0.618
Coffee					
No	31(31.60)	67(68.40)	98	1	
Yes	47(27.20)	126(72.80)	173	1.24(0.72, 2.13)	0.436
Service charge					
Free	38(23.80)	122(76.30)	160	1	
Not free	40(36)	71(64)	111	0.55(0.32, 0.94)	0.029
Traditional medicine					

No	69(29)	169(71)	238	1	
Yes	9(27.30)	24(72.70)	33	1.09(0.48, 2.46)	0.838

COR: crude odds ratio

Presence of drug therapy problem was also assessed based on disease and medication risk factors like presence of comorbidity previous hospitalization, duration since diagnosis, and BP status while the medication factors was number of medication and dosage or frequency . There was significant association between presence of drug therapy problem and presence of comorbidity (Odds Ratio (OR) 10.11; 95% CI 5.11, 20.00, $p < 0.001$), Previous hospitalization once since diagnosis (OR 2.82 95% CI 1.35, 5.89, $p = 0.006$) and also twice and more since diagnosis (OR 7.44 95% CI 0.96, 57.84 $p = 0.055$) uncontrolled BP(OR 5.87 95% CI 3.32, 10.38, $p < 0.001$) taking three and more medication (OR ;7.60 95% CI (3.86,14.99) , $p < 0.001$) and taking medication twice a day (OR 5.59 95% CI 3.03, 10.28 , $p = 0.000$) and also taking medication three times and more(OR 14.23 95% CI 1.72, 118.07, $p = 0.014$) There is no significant difference in drug therapy problem by duration since diagnosis. (See table 10)

Table 10: Bivariant analysis of disease and medication factors with drug therapy problem among hypertensive patients on follow up by using binary logistic regression in Dill Chora Hospital 2015 (N = 271)

Characteristics	Drug therapy problem		Total	COR (95% CI)	P-value
	No (N/%)	Yes (N/%)			
Presence of Comorbidity					
No	66(49.60)	68(50.70)	134	1	
Yes	12(8.80)	125(91.20)	137	10.11(5.11, 20)	0.003
Previous hospitalization					
None	67(34.70)	126(65.30)	193	1	
Once	10(15.90)	53(84.10)	63	2.82(1.35, 5.89)	0.006
≥2	1(6.70)	14(93.30)	15	7.44(0.96,57.84)	0.055
Duration since diagnosis in year					
<one	7(30.40)	16(69.60)	23	1	
1-3	32(28.80)	79(71.20)	111	1.08(0.41,2.87)	0.877
4-6	30(30)	70(70)	100	1.02(0.38,2.74)	0.967
7-9	5(26.30)	14(73.70)	19	1.22(0.32,4.74)	0.769
≥10	4(22.20)	14(77.80)	18	1.53(0.37,6.35)	0.557
Current Blood pressure status					
Controlled	51(52)	47(48)	98	1	
Uncontrolled	27(15.60)	147(84.40)	173	5.87(3.32, 10.38)	0.000
Number of medication taken per day					

< 3 medication	66(24.40)	81(29.90)	147	1	
≥ 3 medication	12(4.40)	112(41.30)	124	7.61(3.86,14.99)	0.000
Dosage or frequency					
Once	37(58.70)	26(41.30)	63	1	
Twice	40(20.30)	157 (79.70)	197	5.59(3.03,10.28)	0.000
≥ three times	1(9.10)	10(90.90)	11	14.23(1.72,118.07)	0.014

COR: crude odds ratio

5.6. Multivariate analysis of risk factors for drug therapy problem among hypertensive patients on follow up in Dill Chora Referral Hospital 2015

In multivariate analysis, selected variables from binary analysis were fitted by backward LR method. Presence of comorbidity, taking three and more medication per day, and uncontrolled blood pressure were independent predictors of DTP among hypertensive patients on follow up in Dill Chora. Patients who had comorbidity are about six times more likely to have DTP compared with those with no comorbidity (AOR =5.74 ; 95% CI =2.49, 13.00, p<0.001). Patients who take three and more medication are about seven times more likely to have DTP compared with those taking less than three medication (AOR =7.04; 95% CI =2.33, 21.25, P=0.001) and patients with uncontrolled blood pressure are about eight times more likely to had DTP compared with those whose BP is controlled (AOR =7.68; 95% CI =3.70, 15.90, p<0.001)

Table 11: Multivariate analysis of independent risk factors for drug therapy problem among hypertensive patients on follow up; in Dill Chora, March-April 2015

Characteristics	Drug therapy problem			AOR (95% CI)	P-value
	No n (%)	Yes n (%)	Total n (100%)		
Presence of co morbidity					
No	66(49.30)	68(50.70)	134	1	
Yes	12(8.80)	125 (91.20)	137	5.74 (2.49,13.00)	<0.001
Number of medication					
< 3	66(24.40)	81(29.90)	147	1	
≥ 3	12(9.70)	112(90.30)	124	7.04(2.33,21.25)	0.001
Blood pressure					
Controlled	51(52)	47(48)	98	1	
Uncontrolled	27(15.60)	146(84.40)	173	7.68 (3.70,15.90)	<0.001

6. DISCUSSION

This study examines the prevalence of drug therapy problem and associated factors among hypertensive patients attended chronic care unit in Dill Chora Referral Hospital located in Dire Dawa. It was found that the overall prevalence of DTP among hypertensive patients attended chronic care unit in Dill Chora Referral Hospital to be 71.20%. Factors associated with drug therapy problem investigated in the study area were presence of comorbidity number of medication, dosage or frequency, previous hospitalization, BP status and service charge.

The independent predictors of drug therapy problem were presence of comorbidity number of medication and BP status

In this study the mean number of antihypertensive drugs per patient was 1.74 ± 0.65 per patients and the most frequently prescribed Antihypertensive medication were hydrochlorothiazide which was similar with the study done in Portugal but not similar with the study done Adama Hospital medical college which was enalapril(46).

Overall patients 37.30 % were on one drug (monotherapy) which was slightly similar with the study done in northern India which was 41% but slightly less than study done in Portugal 47.10% and also in this study about 51.70% patients were on two drugs which is slightly higher than study done in Portugal 45.30% and slightly lower than study done in northern India which was 65% (48)(46).while 11.10% of patients in this study were taking three antihypertensive drugs which was similar with the study done in Hong Kong 10.50% but slightly higher than study done in Portugal(46,49).

This study revealed that a total of 378 DTPs were identified in 193 patients and about 71.20% of the patients had at least one DTP which was less than a total 452 DTPs and 80.70% patients had at least one DTP showed by the study done in Adama Hospital Medical College. This difference might be due to the exclusion of adverse drug reactions in the current study and minor drug drug reaction was considered as DTP in later study(47).

The prevalence showed in current study 71.20% of patients had DTP were lower than what found in Nigeria (94%) and Malaysia (91.80%). This discrepancy with the studies can be attributed to the different study populations, DTP classification and the exclusion of adverse drug reactions in the current study(37),50).

The total number of DTP found in this study is consistent with the study done in Malaysia but the prevalence 90.50% which is higher than in this study. This could be explained by the different DRP classification tool used and adverse drug reactions is not considered in current study(51).

On the other hand the prevalence of DTP found in this study is relatively consistent with the study done in Minnesota 77%(31). In this study, the mean number of DTP is 1.39 per patient when compared with study done in Malaysia specifically on DRPs in T2DM patients with hypertension the average number of problems identified was 1.90 per patient, which is slightly higher than in this study (51). This might be due to the larger sample in current study.

The most common DTP was need additional drug therapy (62.43%) which is comparable with the study done in ambulatory patient in Minnesota (59 %) (31) and study by Robert J. Cipolle and Linda M. Strand (52) on diabetic with Co-morbidities patients who received medication therapy management service also shows (33%) This difference might be explained by the involvement of accredited pharmaceutical care practitioners in the health care process who specialise in the identification and resolution of DTP which might reduce DTP identified in those studies and difference in sampling methods between studies.

This result is in agreement with the Study done in Felege Hiwot Referral Hospital(90.69%)(39) and Jimma University Specialized Hospital(32%)(38) Shows need additional drug therapy is the most common DTPs, the difference in the figures might be those studies were conducted among Hospitalized patients and involvement of clinical pharmacists. This result is also in agreement with a cross-sectional study from Florida Medicaid and participating in the LTCD Program which shows untreated indication 21.60% is one of the most common MRPs(32).

The common untreated indications were prevention of the onset of a new medical condition the addition daily aspirin to prevent myocardial infarction and/or stroke in patients with diabetes, ischemic heart disease or hypertension which is supported by study done in Minnesota and study by Robert J. Cipolle and Linda M. Strand on diabetic with Co-morbidities patients who received medication therapy management service(31,52).

The other most prevalent untreated indications to prevent the onset of a new medical condition (preventive drug required) is absence of statin therapy for patients with DM who are candidates which is supported by a cross-sectional study from Florida Medicaid and participating in the LTCD Program and also with study done in Minnesota(31,32).

Actually there are limited studies focused on medication underutilization that investigated individual drug therapies in Ethiopia , such as the under prescribing of preventive medication like aspirin and statin in hypertensive patients , this study found underutilization of this medication to this patients group missing on their pharmacy profile.

This finding thus indicating that this category of DTP, either for treatment, prevention, or therapy to achieve the desired goals of therapy is substantial among hypertensive patients. It is also clear from the above data the study subjects are at high risk of cardiovascular complication. Determining whether a patient actually requires drug therapy (i.e., need for additional drug therapy) is probably the most complex problem to identify because health practitioner must integrate everything they know about the patient's drug therapy and the patient's social history, as well as considerable knowledge of pathophysiology and pharmacotherapy.

These data suggest that if pharmacists are caring for these patients group on a daily basis can optimize the medication care management and improve overall patient care through the application of pharmaceutical care or through standard patient care process to identify and resolve a variety of DTPs that practitioner see on regular basis. Clinical pharmacists can play a key role in the health care strategy; their skills in pharmacotherapy make them

essential allies in the therapeutic strategy so the inclusion of pharmacists will allow the application of pharmaceutical care to identify DTP.

In contrast, the most common DTP found in this study was not consistent to with the study reported in Adama Hospital Medical College One reason for this could be guidelines and professionals used for identification of DTP which may led to a higher rate of identification of indication related DTPs. it was not also consistent with study done in Malaysia among hypertensive patients the high occurrence untreated indication which might be due to lack of optimal pharmacologic management in the current clinical practice(47,51).

There were 32.82% patients with compliance related DTP, which is relatively consistent study in Nigeria(37). Adherence was measured by the 8-item Morisky Medication Adherence Scale (MMAS-8). In this study the overall rate of non adherence to antihypertensive agents is 45.75% which is consistent with different studies measured by the same scale conducted in Portugal 47.10% Hong Kong 44.90% and Adama Hospital Medical College 44.8 % (46,47,49). The overall rate of non adherence in this study is also consistent with the study conducted in Nigeria which is 45.80%(41) and with study conducted in Adama Referral Hospital which shows 40.50% was non adherence(53).

Because of the asymptomatic nature of the disease, non adherence of patients to their prescribed antihypertensive therapy is a widespread problem. Studies, particularly in Ethiopia have documented non-adherence as a major concern in the treatment of patients with hypertension. The variable related to non-adherence in this study was the use of three or more antihypertensive agents, Presence of comorbidity and educational status. Since complex treatment regimens which were favourable conditions not to adhere to their medications. Patients with co morbidities were less likely to be adherent to their treatment than those without comorbidities .This study is in line with the study done Adama referral hospital(26)Gondar hospital(42). Illiterate patients are less likely to adhere to their medication in this study.

This might explained illiterate patients might not know the necessity of taking drugs for a long time, were not aware that high BP might be asymptomatic, and had no confidence in

managing their condition. Since hypertension is mostly a chronic asymptomatic condition, patients may not feel any physical symptoms from it, and without knowing the need to take drugs regularly for a long time, they may forget to take their medicine or feel that there is no need to take them.

Hence, counselling is very important to increase the awareness and knowledge of this patient population since they frequently encounter these problems. Modern approaches for improving adherence include not only the cooperation between health care professionals and patients, but also family members. Team approach which involves the knowledge and practical skills of all team members, with psychoeducation programs, the application of behavioural techniques and individualization of pharmacotherapy may improve the patient's attitude towards treatment, and thus lead to the realization of adequate cooperation.

On the other hand the non adherence finding in this result is higher than the study done in Gondar and Dessie in which the non adherence was 35.40% (42) and 26%(25),respectively. This variation might partly be explained by the limited precision of the method for measuring adherence, subjective nature of the self reported questionnaire, the number and types of patients and also the difference in clinical practice of role of pharmacist's advice which improve patient's adherence to long-term therapy. It is also higher than the study done in china 34.90%(54) might be due to better access and care to patients in China.

On bivariate analysis socio-demographic and lifestyle has no significant association with drug therapy problem except occupation category and accessing medication by fee which showed a significant association with DTP among hypertensive patients.

As for occupation category, patients who were trader were more likely to have DTP. A reasonable plausible explanation is that trader patients could be occupied by their job duties so they might sometimes find adherence to their medication schedule difficult which is one of the most common DTP identified in this study.

In this study patients accessing service by fee were more likely to have drug therapy problem. This might be explained patients who do not get service by free may have

medical cost related burden associated with laboratory and medication. This might contribute to non-adherence behaviour. Even though studies are limited which agrees with this finding, lack of health care coverage is hidden issue that has emerged as important issue. study done in Switzerland shows that the control of cardiovascular risk factors, quality of life and healthcare costs are statistically related to the presence of DRP(55).

Previous hospitalization had also found to have significant association with drug therapy problem .There are limited studies which shows this association but the possible explanation might be patients with previous hospitalization may have more complication than those who do not have, the optimal pharmacotherapy for this patients need through investigation which might be difficult for the physicians .

This study also observed statically significant association between dosage frequency and DTP regarding the influence of dosage frequency on DTP there are limited studies. The possible explanation might be daily dose frequencies of the medications prescribed may negatively affect adherence which is turn one of the most common DTP identified.

In this study presence of comorbidity was associated with occurrence drug therapy problem. Patients with comorbidities were more likely to experience DTP than those without comorbidities. which was consistent with study conducted in Adama Hospital medical college (47) and also studies conducted in Jordan(36) and England(56). This might be because presence of co morbidity increase number of drugs the patients take in which taking more medication in turn negatively affect adherence which is one o the most DTP identified .The other reason might be patients with Co-morbidities can worsen the conditions of the patient and make them unable to adhere to their antihypertensive medications.

In this study Numbers of medication taken per day showed a statically significant association with the occurrence of DTP. While no specific number of medications has been established to define polypharmacy, some have arbitrarily suggested cut-point of 3 to 5 drugs per patient(57). The increasing number of drugs used can lead to an increased risk of DTP. This finding was consistent with the study conducted in Jordan and

France(58)(59) and also with the study conducted Florida(21) and Adama Hospital medical college(47). Patients with multiple medications often have a complex drug schedule. The frequent daily drug administration and different pill numbers for each medication may contribute to the poor medication adherence problem in these patients which is one of the major finding in this study and also increase the risk of adverse drug reactions even though not considered in this study.

In this study blood pressure control level was associated with drug therapy problem. Those patients with uncontrolled blood pressure had more likely to experience drug therapy problem. It might be attributable to adherence behaviour of the patient which is one part of drug therapy problem.

In the treatment of hypertension, poor adherence affects the clinical outcome. Its first consequence is the failure in BP control which means non-adherent patients are at risk of not achieving BP control; which is supported by studies conducted in Portugal and Iran showing significant relationship between adherence level and BP control(46)(60).

Limitation of the study

First, the study evaluated only a single Hospital in a specific geographic area and the short duration of the study prevent extrapolation of our results to the general population of hypertensive patients. It is possible that prescribing practices and patient characteristics specific to this region could have skewed our result or may differ from other areas, hence limiting its representativeness and it may not be generalizable to other health care settings.

The identification and assessment of the DTPs other than adherence were based on the data available from the medical records and prescription with reference to established literature and guidelines.

Secondly research methodologies involving self-reported that is Morisky scores measures depend largely on individuals' memory, and recall bias may exist. The differences in classification of DTPs and the type of references used, which vary between studies, leading to differences in identification of type and number of drug related problems hence, discrepancy in many study results may be observed.

Lastly Safety related problems adverse drug reactions was not included because of budget, time, and skilled personnel who can perform adverse drug reaction identification algorithms constraints due to the limitation of the current study.

7: CONCLUSION AND RECOMMENDATION

7.1. Conclusion

This study showed managing patients with hypertension is prone to different DTP for different reasons including presence of comorbidity and concurrent medication. In this study, relatively higher prevalence of DTPs was identified and the most common were need of additional therapy and non-compliance to prescribed medication. The independent predictor found to be associated with drug therapy problem were presence of comorbidity, number of medication and uncontrolled blood pressure. .

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7.2. Recommendations

Based on the findings of this study the following recommendations are made:

- Special attention should be given to hypertensive patients with comorbidity and should be closely monitored for DTPs,
- Schedule more frequent appointment and physician contact with patients who are not achieving goal blood pressure.

To Minister of health

- Developing and adopting guideline to establish nationwide specific and comprehensive cardiovascular disease management guide line.
- To effectively establish and develop pharmaceutical care services in hospitals since the current findings have important implications on practice, particularly pertaining to the implementation of pharmaceutical care services.

To pharmacists

- To strengthen pharmaceutical care services since early identification and prevention of drug therapy problem in hypertensive patients are necessary to prevent complication.
- Special attention should be given to counselling which is important to increase the awareness and knowledge of this patient population. Modern approaches for improving adherence include not only the cooperation between health care professionals and patients, but also family members.

To pharmaceutical fund and supply agency and importers

- Since number of medication was found as major risk factor for drug therapy problem fixed dose combination antihypertensive drugs should be available to the market which reduce patients pill burden.
- **To Researchers** to investigate the impact of DTP on health outcome.

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ANNEXES

Annex I: questionnaire

I. socio-demographic characteristics

English version of the questionnaire

Card No. _____ Date _____

101. Age in years _____

102. Sex 1. Male 2. Female

103. Occupation?

1. Retired
2. Unemployed
3. Merchant
4. Farmer
5. Employee (governmental and nongovernmental)
6. Other (specify) _____

104. Educational status?

1. Illiterate
2. Primary education
3. Secondary
4. College and university

105. Religion?

- 1. Orthodox
- 2. Muslim
- 3. Protestant
- 4. Others (Specify)_____

106. Marital status?

- 1. Married
- 2. Single
- 3. Divorced 4. Widowed

II. Lifestyle factors

- 107. Do you currently smoke cigarette? 1.Yes 2.No
If yes how many per day_____
- 108. Do you drink alcohol? 1.Yes 2.No
If yes how many per day_____
- 109. Do you chew khat? 1. Yes 2. No
- 110. Do you do physical exercise? 1.yes 2.No
If yes how many times per week _____
- 111. Do you drink coffee? 1.Yes 2.No
- 112. Do use traditional medicine? 1. Yes 2.,No
- 113. Where do you live? _____
- 114. Service charge 1.Free 2.Not free
- 115. Medication adherence behaviour using 8-MMAS

III, Adherence (Morisky 8-Item Medication Adherence Questionnaire) :	
Scores: 3-8 = Low adherence 1- 2 = Medium adherence 0 = High adherence	
<i>For each of the following questions please write “1” if the response is ‘yes’ and write ‘0’ if the response is ‘No’.</i>	
	Yes=1/No=0
	Do you sometimes forget to take your medicine?

	People sometimes miss taking their medicines for reasons other than forgetting. Thinking over the past 2 weeks, were there any days when you did not take your medicine?	
	Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?	
	When you travel or leave home, do you sometimes forget to bring along your medicine?	
	Did you take all your medicines yesterday?	
	When you feel like your symptoms are under control, do you sometimes stop taking your medicine?	
	Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?	
	<p>How often do you have difficulty remembering to take all your medicine</p> <p>___A. Never/rarely</p> <p>___B. Once in a while</p> <p>___C. Sometimes</p> <p>___D. Usually</p> <p>___E. All the time</p>	<p>A = 0;</p> <p>B-E = 1</p>
	Total score	

ክፍል አንድ ፡ - ስነ ህዝብ ፍጻሜ በራዊ ጉዳዮች

ካርድ ቁጥር -----

ቀን -----

101. እድሜ -----

102. ፆታ 1. ወንድ 2. ሴት

103. ሥራ

1. ጠረጣጥ
2. ስራ የለለው
3. ነጋዴ
4. አርሶአደር /ገበሬ/
5. ስራ ያለው (የመንግስት ሠራተኛ ፣ የግል ተቀጣሪ)

104. የትምህርት ደረጃ

1. ያልተማረ/ች
2. አንደኛ ደረጃ ትምህርት
3. ሁለተኛ ደረጃ ትምህርት
4. ኮሌጅና ዩኒቨርሲቲ

105. ሐይማኖት

1. ኦርቶዶክስ
2. መብላም
3. ፕሮቴስታንት
4. ሌላ ከሆነ ይጠቀስ -----

106. የጋብቻ ሁኔታ

1. ያገባ/ች
2. ያላገባ/ች
3. የፈታ/ች
4. ባልየ ሞተባት

ክፍል ሁለት፡ - የአኗኗር ሁኔታ

107. ሲጋራ ታጨሳለህ ?

1. አጨሳለው
2. አላጨሰም

መልሱ አጨሳለው ከሆነ በቀን ምን ያህል ሲጋራ በቁጥር -----

108. የአልኮል መጠጥ ትጠጥህ/ሽ ?

1. እጠጥለው
2. አልጠጣም

መልሱ እጠጥለው ከሆነ በቀን ምን ያህል የአልኮል ጠርመሽ -----

109. ጫት ትቅማለህ/ሽ ?

1. እቅማለው
2. አልቅምም

110. የአካል እንቅስቃሴ ታደርጋለህ/ሽ ?

1. አደርጋለው
2. አላደርግም

መልሱ አደርጋለው ከሆነ በሳምንት ምን ያህል ጊዜ -----,

111. በና ትጠጥህ/ሽ?

1. እጠጥለው
2. አልጠጣም

112. ባህላዊ መድሃኒት ትጠቀማለህ/ሽ ወይ?

1. አዎ
2. አልጠቀምም

113. የመኖሪያ ቦታ

1. ከተማ ወስጥ

2. ከከተማ ወጪ

114. የህክምና አገልግሎት የምታገኘው

1. በነፃ

2. በገንዘብ

ለጥናታችን ስኬት ትክክለኛውን መረጃ እንዲሰጡ በአክብሮት እንጠይቃለን።

ለሚከተሉት ጥያቄዎች መልሱ አዎንታዊ ነ 1 የለም ከሆነ 0 ዓፋ	አዎ=1 / የለም=0
1. አንዳንድ ጊዜ መድሀኒትህን/ሽን መውሰድት ረሳለህ / ሽ?	
2. አንዳንድ ጊዜ ከመርሳት ውጪ መድሀኒቶች የማይወሰዱበት አጋጣሚ አለበት ለፈውሁ ለትሳምንት መድሀኒትህን/ሽን ያልወሰድክበት/ያልወሰድሽበት ቀን አለ?	
3. መድሀኒትህን/ሽን ስትወስዱ በጎንጎሮሽጎዳት ምክኒያት ለሚከታተልህ/ሽ ባለሞያ ሳይሆን ሌላው/ቀ/ቂ አቁመህ/ሽ ወይም መጠኑን ቀንሰህ/ሽ ታውቃለህ/ሽ ?	
4. መንገድ ስትገዛ/ሽ ወይም ለረዥም ሰዓት ትከባታህ/ሽ ስትረቅ መድሀኒትህን/ሽን አንዳንዴት ረሳለህ/ሽ ?	
5. መድሀኒትህን/ሽን ትላንት ወስደህል/ሻል ?	
6. ህመም ጥላቻ ስትሰማ/ሽ በማሰብ አንዳንዴ መድሀኒት መውሰድ ታቆማለህ/ሽ ?	
7. መድሀኒት መውሰድ ህክምና በምትከታተልበት/ይበት ጊዜ የመሰላቸት ሁኔታ ገጥሞህ ያውቃል?	
8. ሁሉንም መድሀኒትህን/ሽን ለመውሰድ የመርሳት ችግር ያጋጥምህል? ሀ. በፍፁም ለ. ከስንት አንዴ ሐ. አንዳንዴ መ. ብዙ ጊዜ ሠ. ሁል ጊዜ	ሀ=1 ለ-ሠ=0

ANNEX II Data extraction format (checklist)

Card number _____

date

Age _____

Sex _____

Date of registration _____

Part one

Disease condition and medication related

1 .Duration of the hypertension, since diagnosis, in year _____

2. Does the patient have co morbidity? 1. Yes 2. No

If yes write the type of co morbidities _____

Total number of co morbidity 1.One 2. Two 3. Three and more

3. Does the patient have history of hospitalization since diagnosis? 1. Yes 2. No

If yes how many times _____

4. Write patients last three visit blood pressures.

Date		Current		
BP	Systolic			
	Diastolic			

5. What is the antihypertensive medication the patient takes? (Cross check patients prescription and chart for current) and write the medication below.

Date	Antihypertensive Medication Write the name dose frequency
------	--

Current	

6. Other medical condition or comorbidity

If patients have diabetes mellitus as comorbidity write the last three visit FBS?

Date	Current		
FBS			

Anti diabetic Medication given write the name dose frequency given

1. _____

2. _____

Weight if available _____

Medical condition	Medication given	Dosage regimen

Current PRN drugs therapy

Drug name/strength/rout	Schedule	Medical condition

7. Total number of medication the patient's takes _____

8. Write Laboratory result for the patients

Investigations		date			Normal range
S.No.	Type				
1	Serum K				
2	Serum Na				
3	BUN				
4	Serum cr				
5	Serum Ca				
6	Serum Mg				
7	Serum Cl				
8	Total protein				
9	Albumin				
10	FBG				
11	RBS				
1	TG				
2	Total chol.				
3	LDL				
4	HDL				
1	AST				
2	ALT				
3	PT				

4	INR				
5	aPTT				
7	Total Bili.				
8	Indirect Bili.				
9	Protein urea				
10	HBs ag				
11	HCV antibody				
1	Ketone				
2	Protein				
3	Glucose				
4	WBC				
5	RBC				
6	Cast				
7	Nitrites				
8	Cr Cl				
9	GFR				
1	WBC				
2	RBC				
3	PLT				
4	Hgb				
5	HCT				
6	Neu.				
7	Lymph.				
8	Mono.				
9	Eos.				
10	Baso.				
11	Bands				
12	ESR				
13	AFB				
14	BF				
15	PIHCT				
16	CD4				

IV. Assessment of problems with the medication prescribed

1. Total numbers of drugs prescribed? _____ Total no. of comorbidities?

2. Is there a need for additional drug therapy? Yes____ No_____

3. If yes for no. 2, what is the reason for additional drug therapy need?

- a) A medical condition that require initiation of drug therapy.
- b) Preventive drug therapy required to reduce the risk of developing a new condition.
- c) To attain synergistic effect or additive effect
- d) Others (Specify) _____

4. If 'Yes' for no. 2, please list those medical problems needing additional medication

Date	Indication	Drug regimen with the problem	Cause(Write letter)

5. Is there any medication with too low dosage?

- a) Yes
- b) No

6. If Yes for no. 5, what is the cause for dosage to be too low?

- a) The dose is too low to produce the desired response
- b) The dosing is too infrequent to produce the desired response
- c) There is a drug interaction which decreases the concentration of drug
- d) The duration of drug therapy is short to produce the desired response
- e) Others (Specify) _____

7. If 'Yes' for 5, please list those with dose too low with their causes

Date	Indication	Drug regimen with the problem	Cause (Write letter)

8. Is there any medication with too high dosage? a) Yes b) No

9. If Yes for no. 8, what is the cause for dosage to be too high?

- a) The dose given is too high
- b) There is a drug interaction which results in a toxic reaction to the drug product
- c) The dosing frequency is too short
- d) The duration of drug therapy is long for a given condition
- e) The dose of the drug was administered too rapidly
- f) Adjustment for renal impairment was not done

10. If 'Yes' for 8, please list those with dose too high with their causes

Date	Indication	Drug regimen with the problem	Cause(Write letter)

11. Is there any unnecessary medication therapy for the patient? a) Yes b) No

12. If Yes for no. 11, what are the reasons for unnecessary drug therapy?

- a) No valid medical indication for the drug therapy at this time
- b) Multiple drug products are used for a condition that needs single drug therapy.
- c) The medical condition is more appropriately treated with non-drug therapy.
- d) Drug therapy is used to treat an avoidable adverse drug reaction associated with a drug
- e) Drug abuse, alcohol use, or smoking is causing the problem
- f) Only Life style can be used to control the condition

13. If yes, for no. 11, list unnecessarily prescribed medication and the causes

Date	Indication	Drug regimen with the problem	Cause(Write letter)

14. is there any ineffective medication therapy used?

- a) Yes
- b) No

15. If yes for no. 14, what was the cause?

- a) The drug is not the most effective for the medical problem
- b) The medical condition is refractory to the drug product.
- c) The dosage form of the drug product is inappropriate
- d) The drug product is not an effective product for the indication being treated
- e) Others (Specify) _____

16. If yes for no.14, List the ineffective medication used

Date	Indication	Drug regimen with the problem	Cause(Write letter)

Annex-III patient information sheet

Information Sheets, Consent Form

JIMMA UNIVERSITY COLLEGE OF MEDICAL AND PUBLIC HEALTH SCIENCES,
DEPARTMENT OF PHARMACY

INFORMATION SHEET TO DETERMINE DRUG THERAPY PROBLEM IN DILCHORA
HOSPITAL, EASTERN ETHIOPIA, 2015

Title of the project: Drug therapy problem among hypertensive patients at follow up in Dil
Chora Hospital, Eastern Ethiopia, 2015

Name of the principal investigator: Abadir Hussen

Name of the organization: Jimma University (pharmacy department)

Purpose

The study findings will help to identify and determine risk factors associated with drug therapy problem in hypertensive patients and will help to strength pharmaceutical care process.

Procedures

If you are in to participate in the study and agree a consent form after that the following interview will be undertaken

Risks and discomforts

No risk and discomfort since no procedure is going to be done.

Benefits

There is no direct financial benefit you will get by participating in this study but appropriate intervention will be pointed.

Confidentiality

Any information obtained during this study will be kept confidential. This is assured by avoiding use of any identifier and information was recorded with code number.

Voluntary participation

Participation on this study is voluntary and you have the right to refuse participation at any time. Your decision will not result in any penalty or loss of benefits to which you are entitled. Your decision will not put at risk any present or future medical care or other benefits to which you otherwise entitled. You may ask questions now and in the future if you do not understand something that is being done. Here are addresses of individuals who you can contact:

Abadir Hussen, phone no: - +251911557485, Email: - seidhussen91@yahoo.com

Fekede Bekele, phone no: - +251911758845, Email: -fekedeb@gmail.com

Dr. Elias Ali Yesuf, phone no: - +251932097329, Email: - eliasaliyesuf@yahoo.com

Annex-IV: Declaration

I, the undersigned, declare that this research thesis is my original work and has not been presented for degree or any other University and all sources of material used for this thesis have been fully acknowledged.

Name of the student _____

Signature _____

Name of the institution: Jimma University

Date. _____

APPROVAL OF THE FIRST ADVISOR

This thesis has been submitted with my approval as university advisor.

Name of the first advisor: _____

Name of the institution _____

Date _____ signature _____

APPROVAL OF THE SECOND ADVISOR

This thesis has been submitted with my approval as university advisor.

Name of the second advisor: _____

Name of the institution _____

Date _____ signature _____